

WHAT IS CLAIMED IS:

- 1           1.       A method for managing a multi-page document, comprising:  
2           receiving a plurality of input files including digital representations of multiple pages  
3           of a document, wherein the content of each entire page is represented in a first  
4           representation format, wherein the entire page content is capable of including content of a  
5           first content type and second content type;  
6           for each page of the document represented in the input files, performing:  
7               (i) determining regions in the page including content of the second content  
8           type;  
9               (ii) processing each determined region in the page to generate the content  
10          for each region in a second representation format; and  
11               (iii) adding the content of the entire page in the first representation format  
12          and the content of each region in the second representation format to at least one  
13          output file; and  
14          storing the output file.
- 1           2.       The method of claim 1, wherein the first content style comprises text and  
2           line art and wherein the second content style comprises a continuous tone image.
- 1           3.       The method of claim 1, wherein the first representation format comprises a  
2           device dependent image format and the second representation format comprises a device  
3           independent image format.
- 1           4.       The method of claim 3, wherein the device dependent format comprises a  
2           halftone image format and the device independent format comprises a grey scale image  
3           format.

1           5.       The method of claim 4, wherein processing each determined region in the  
2 page to generate content in the gray scale format comprises descreening the halftone format  
3 of the determined region in the page to generate the determined region in the gray scale  
4 image format.

1           6.       The method of claim 1, wherein each output file is capable of including  
2 content in the first and second representation formats for one page.

1           7.       The method of claim 1, wherein each output file is capable of including  
2 content in the first and second representation formats for a plurality of pages.

1           8.       The method of claim, further comprising:  
2 selecting the output files to render; and  
3 for each page of the document represented in the selected output files, performing:  
4               (i) accessing the content of the entire page in the first representation format;  
5               (ii) accessing the content for each region in the page in the second  
6 representation format;  
7               (iii) processing the content for each region in the page in the second  
8 representation format to generate the content for each region in the first  
9 representation format;  
10              (iv) merging the content for the entire page and the content for each region  
11 in the first representation format into page output in the first representation format;  
12 and  
13              (v) rendering the page output for each page into a human observable  
14 format.

1           9.       The method of claim 8, wherein each output file includes one data structure  
2     for the content of the entire page in the first representation format and one additional data  
3     structure of the content for each determined region in the second representation format.

1           10.      The method of claim 9, wherein the output file comprises a Tagged Image  
2     File Format (TIFF) file and wherein information on each data structure is maintained in an  
3     image file directory (IFD).

1           11.      The method of claim 8, further comprising:  
2             determining if a high quality option is selected, wherein the step of processing the  
3     content for each region in the second representation format to generate the content for each  
4     region in the first representation format and merging the content for the entire page and each  
5     page region is only performed if the high quality option is selected.

1           12.      The method of claim 11, further comprising:  
2             rendering the content of the entire page in the first representation format if the high  
3     print quality is not selected.

1           13.      The method of claim 8, wherein each region in the page in the second  
2     representation format is processed to generate the content for each region in the first  
3     representation format in a manner that optimizes the generated content in the first  
4     representation format for rendering on one of multiple output devices.

1           14.      The method of claim 1, wherein the multi-page document is managed in a  
2     printing system.

1           15.     The method of claim 1, wherein the multi-page document is managed within  
2     a network publishing system to archive the document for later rendering on one of multiple  
3     network printing devices.

1           16.     A system for managing a multi-page document, comprising:  
2           means for receiving a plurality of input files including digital representations of  
3     multiple pages of a document, wherein the content of each entire page is represented in a  
4     first representation format, wherein the entire page content is capable of including content of  
5     a first content type and second content type;  
6           means for performing for each page of the document represented in the input files:  
7                 (i) determining regions in the page including content of the second content  
8                 type;  
9                 (ii) processing each determined region in the page to generate the content  
10                for each region in a second representation format; and  
11                (iii) adding the content of the entire page in the first representation format  
12                and the content of each region in the second representation format to at least one  
13                output file; and  
14           storing the output file.

1           17.     The system of claim 16, wherein the first content style comprises text and  
2     line art and wherein the second content style comprises a continuous tone image.

1           18.     The system of claim 16, wherein the first representation format comprises a  
2     device dependent image format and the second representation format comprises a device  
3     independent image format.

1           19.     The system of claim 18, wherein the device dependent format comprises a  
2 halftone image format and the device independent format comprises a grey scale image  
3 format.

1           20.     The system of claim 19, wherein the means for processing each determined  
2 region in the page to generate content in the gray scale format descreens the halftone format  
3 of the determined region in the page to generate the determined region in the gray scale  
4 image format.

1           21.     The system of claim 16, wherein each output file is capable of including  
2 content in the first and second representation formats for one page.

1           22.     The system of claim 16, wherein each output file is capable of including  
2 content in the first and second representation formats for a plurality of pages.

1           23.     The system of claim 16, further comprising:  
2 means for selecting the output files to render; and  
3 means for perform for each page of the document represented in the selected  
4 output files:  
5               (i) accessing the content of the entire page in the first representation format;  
6               (ii) accessing the content for each region in the page in the second  
7 representation format;  
8               (iii) processing the content for each region in the page in the second  
9 representation format to generate the content for each region in the first  
10 representation format;

11 (iv) merging the content for the entire page and the content for each region  
12 in the first representation format into page output in the first representation format;  
13 and  
14 (v) rendering the page output for each page into a human observable  
15 format.

1 24. The system of claim 16, wherein each output file includes one data structure  
2 for the content of the entire page in the first representation format and one additional data  
3 structure of the content for each determined region in the second representation format.

1 25. The system of claim 24, wherein the output file comprises a Tagged Image  
2 File Format (TIFF) file and wherein information on each data structure is maintained in an  
3 image file directory (IFD).

1 26. The system of claim 25, further comprising:  
2 means for determining if a high quality option is selected, wherein the steps of  
3 processing the content for each region in the second representation format to generate the  
4 content for each region in the first representation format and merging the content for the  
5 entire page and each page region is only performed if the high quality option is selected.

1 27. The system of claim 26, further comprising:  
2 means for rendering the content of the entire page in the first representation format if  
3 the high print quality is not selected.

1 28. The system of claim 23, wherein each region in the page in the second  
2 representation format is processed to generate the content for each region in the first

- 3 representation format in a manner that optimizes the generated content in the first  
4 representation format for rendering on one of multiple output devices.

1 29. The system of claim 16, wherein the multi-page document is managed in a  
2 printing system.

1 30. The system of claim 16, wherein the multi-page document is managed  
2 within a network publishing system to archive the document for later rendering on one of  
3 multiple network printing devices.

1 31. An article of manufacture implementing code to manage a multi-page  
2 document by:

3 receiving a plurality of input files including digital representations of multiple pages  
4 of a document, wherein the content of each entire page is represented in a first  
5 representation format, wherein the entire page content is capable of including content of a  
6 first content type and second content type;

7 for each page of the document represented in the input files, performing:

8 (i) determining regions in the page including content of the second content  
9 type;

10 (ii) processing each determined region in the page to generate the content  
11 for each region in a second representation format; and

12 (iii) adding the content of the entire page in the first representation format  
13 and the content of each region in the second representation format to at least one  
14 output file; and  
15 storing the output file.

1           32.     The article of manufacture of claim 31, wherein the first content style  
2 comprises text and line art and wherein the second content style comprises a continuous  
3 tone image.

1           33.     The article of manufacture of claim 31, wherein the first representation  
2 format comprises a device dependent image format and the second representation format  
3 comprises a device independent image format.

1           34.     The article of manufacture of claim 33, wherein the device dependent  
2 format comprises a halftone image format and the device independent format comprises a  
3 grey scale image format.

1           35.     The article of manufacture of claim 34, wherein processing each determined  
2 region in the page to generate content in the gray scale format comprises descreening the  
3 halftone format of the determined region in the page to generate the determined region in  
4 the gray scale image format.

1           36.     The article of manufacture of claim 31, wherein each output file is capable  
2 of including content in the first and second representation formats for one page.

1           37.     The article of manufacture of claim 31, wherein each output file is capable  
2 of including content in the first and second representation formats for a plurality of pages.

1           38.     The article of manufacture of claim 31, further comprising:  
2 selecting the output files to render; and  
3 for each page of the document represented in the selected output files, performing:  
4               (i) accessing the content of the entire page in the first representation format;



- 5 (ii) accessing the content for each region in the page in the second  
6 representation format;  
7 (iii) processing the content for each region in the page in the second  
8 representation format to generate the content for each region in the first  
9 representation format;  
10 (iv) merging the content for the entire page and the content for each region  
11 in the first representation format into page output in the first representation format;  
12 and  
13 (v) rendering the page output for each page into a human observable  
14 format.

1 39. The article of manufacture of claim 38, wherein each output file includes  
2 one data structure for the content of the entire page in the first representation format and  
3 one additional data structure of the content for each determined region in the second  
4 representation format.

1 40. The article of manufacture of claim 39, wherein the output file comprises a  
2 Tagged Image File Format (TIFF) file and wherein information on each data structure is  
3 maintained in an image file directory (IFD).

1 41. The article of manufacture of claim 38, further comprising:  
2 determining if a high quality option is selected, wherein the step of processing the  
3 content for each region in the second representation format to generate the content for each  
4 region in the first representation format and merging the content for the entire page and each  
5 page region is only performed if the high quality option is selected.

1           42.     The article of manufacture of claim 41, further comprising:  
2           rendering the content of the entire page in the first representation format if the high  
3     print quality is not selected.

1           43.     The article of manufacture of claim 38, wherein each region in the page in  
2     the second representation format is processed to generate the content for each region in the  
3     first representation format in a manner that optimizes the generated content in the first  
4     representation format for rendering on one of multiple output devices.

1           44.     The article of manufacture of claim 31, wherein the multi-page document is  
2     managed in a printing system.

1           45.     The article of manufacture of claim 31, wherein the multi-page document is  
2     managed within a network publishing system to archive the document for later rendering on  
3     one of multiple network printing devices.